

ABSTRACT

A reactor apparatus and related method for controlling at least one process variable in a circulating fluid bed oxygenates to olefins reactor system comprising a riser are provided. The process variable is selected from at least one of (i) space velocity, (ii) average reaction temperature, (iii) conversion of reactant, and (iv) average coke level on catalyst. Typically, a corresponding set point for at least one process variable is selected from (1) reactant feed rate, (2) feed enthalpy, (3) reactor temperature-related function, e.g., mid-temperature or rate of temperature rise along a portion of the reactor, and (4) catalyst hold-up in the riser of the reactor. A corresponding manipulated variable is selected from (a) feed flow control valve(s), (b) feed preheat rate, (c) activity of the catalyst in the reactor, and (d) amount of catalyst in the reaction zone. The combination of measured and manipulated variables described here allows for smooth, stable control of the reactor at the optimum performance level.

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